

# Training Within Industry

Martina Džubáková\*, Michal Kopták†

## Abstract

The trainer is one of the most important roll a supervisor must have to eliminate common daily problems and improve supported process. Since TWI was originally developed during World War II, one trend that has emerged in the workplace is the practice of placing training responsibilities that were once the domain of the supervisor to the specific departments. As a result, these supervisors spend their days chasing down problems and finding ways to make things work and meet productivity targets a customer requirements. “Reborn” TWI programs return supervisors to a more active role, reversing the way in which many companies operate today.

## Keywords:

Training within the industry  
Corporate education  
Kaizen

## 1 Introduction

The Training Within Industry Service (TWI) was established in 1940 during World War II in USA to increase production output. The “J” program would evolve and have a major impact on manufacturing in the United States during the war. TWI program developed by the USA TWI Service were after the defeat of Japan incorporated in to country reconstruction program. The massive TWI’s programs over the following decades in Japanese industry become an integral part of what is known today as Japanese Management. A major key of these methods is kaizen, which has its source from the TWI. Kaizen continued to evolve in post-war-Japan through today to become some of the most successful management techniques in use today in industry. From 2006 we observe rebirth of the TWI (from Donald Dinero book Training Within Industry: The foundation of Lean). The rebirth is occurring primarily in the “lean” community. “Lean” is used to describe Toyota’s business philosophy, which is to eliminate any resource not used for the express purpose of providing value to the customer. Many companies are working to be lean, but most fail to achieve Toyota’s level of success. The answer is TWI. TWI provides Toyota with some key advantages over those lean-seeking companies not using the program.

The figures 1 shows relative volume of term “Training Within Industry” search from year 2007. Volume of TWI searches is growing rapidly in year 2010. The horizontal axis of the graph represents time, and the vertical is how often a term is searched for relative to the total number of searches globally.

## 2 TWI reborn

TWI is based on Four step Job instruction methods created by Charles Allen: “Each complete teaching lesson calls for four steps, or teaching operations known as step 1, Preparation, step 2, Presentation, step 3, Application and step 4, Testing (or Inspection). These steps, are always carried out in the order given – The purpose of step 1 is to get the learner ready to be instructed, of step 2 to instruct him, of step 3 to check up errors, and of step 4 to give a final inspection of the instruction job” (Allen, 1919, p. 129.).

\* Ekonomická univerzita v Bratislave, Fakulta podnikového manažmentu, Dolnozemska cesta 1, 852 35 Bratislava. E-mail: [martina.dzubakova@euba.sk](mailto:martina.dzubakova@euba.sk)

† Ekonomická univerzita v Bratislave, Fakulta podnikového manažmentu, Dolnozemska cesta 1, 852 35 Bratislava. E-mail: [koptak.michal@gmail.com](mailto:koptak.michal@gmail.com)



**Fig. 1:** Relative volume of Term Training Within Industry internet search (Google Trend, [www.google.com/trends](http://www.google.com/trends))

The importance of teaching and instructing instead of telling and showing became the main foundation of the TWI programs (p.10.) TWI continued to with Supervisor Needs (TWI, 1945, p. 48). Every Supervisor has Five Needs:

1. Knowledge of the Work
2. Knowledge of Responsibility
3. Skill in Instructing
4. Skill in Improving Methods
5. Skill in Leading

Each of the 3 skills that can be generally trained by TWI standard program.

- Job Instruction (JI) for the instruction skills
- Job Relations (JR) for the leading skills
- Job Methods (JM) for the improving methods

TWI program, known as “The “J” program” (Job Instruction, Job Methods, Job Relation) were constructed from Allen’s **Job instruction** 4 steps. It has strong emphasis on training methods and skills.

## 2.1 Job Instruction

Job instruction program teaches the method to instruct a worker how to perform a job correctly, safely and conscientiously. As is frequently the case, most processes are performed by various workers using different methods. Job Instruction requires the “one best way” identification, and teaching the process to this one way, and thereby creates a standard method. The basis of stability is generated by doing the same thing the same way across operators and shifts. Figure 2 shows numbers and types of assembly defects variation in trained and untrained situation. Proper training eliminates range of defects types, and also reduce number of defects.

Another benefits experienced when practicing Job Instruction are reduced training time, less rework, fewer accidents, and increased job satisfaction. Each “J” program is standardized. The Job Instruction training manual is often referenced by Job Instruction card and their use during the training sessions. All persons attending were issued a card. Figure 3 shows “JI” card example developed by Training Within Industry Service USA in 1943. The front of the card outlines the instructor or supervisor’s procedure for “getting ready” to instruct. The back of the card outlines the four-step method of How to Instruct. The small pocket sized card was an important training tool.

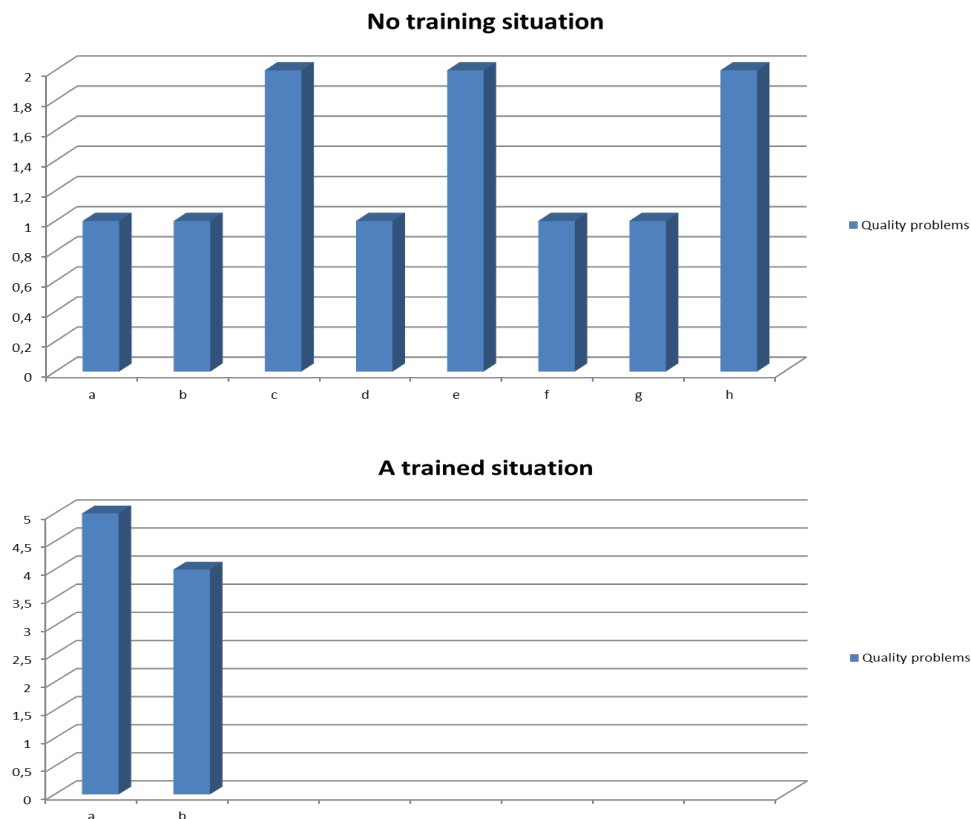


Fig. 2: Training effect, defect elimination.

<p><b>HOW TO GET READY TO INSTRUCT</b></p> <p><b>Have a Time Table</b>—how much skill you expect him to have, by what date.</p> <p><b>Break Down the Job</b>—list important steps, pick out the key points. (Safety is always a key point.)</p> <p><b>Have Everything Ready</b>—the right equipment, materials, and supplies.</p> <p><b>Have the Workplace Properly Arranged</b>—just as the worker will be expected to keep it.</p> <p><b>Job Instruction Training</b></p> <p><b>TRAINING WITHIN INDUSTRY</b> Bureau of Training War Manpower Commission</p> <p><b>KEEP THIS CARD HANDY</b> GPO 16-35140-1</p> <p>Front of the Job Instruction Card</p>	<p><b>HOW TO INSTRUCT</b></p> <p><b>Step 1—Prepare the Worker</b> Put him at ease. State the job and find out what he already knows about it. Get him interested in learning job. Place in correct position.</p> <p><b>Step 2—Present the Operation</b> Tell, show, and illustrate one IMPORTANT STEP at a time. Stress each KEY POINT. Instruct clearly, completely, and patiently, but no more than he can master.</p> <p><b>Step 3—Try Out Performance</b> Have him do the job—correct errors. Have him explain each KEY POINT to you as he does the job again. Make sure he understands. Continue until YOU know HE knows.</p> <p><b>Step 4—Follow Up</b> Put him on his own. Designate to whom he goes for help. Check frequently. Encourage questions. Taper off extra coaching and close follow-up. 16-35140-1</p> <p><b>If Worker Hasn't Learned, the Instructor Hasn't Taught</b></p> <p>Back of the Job Instruction Card</p>
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Fig. 3: Job Instruction Card. Source: War Production Board, Bureau of Training, Training Within Industry Service, 1943, Job Instruction: Sessions Outline and Reference Material (Washington D.C.: U.S. Government Printing Office), Inside back cover.

Jl contents four steps:

- **Preparation** - provide a positive learning atmosphere for the workers by putting them at ease, evaluating what they already know, and reiterating the importance of job safety.

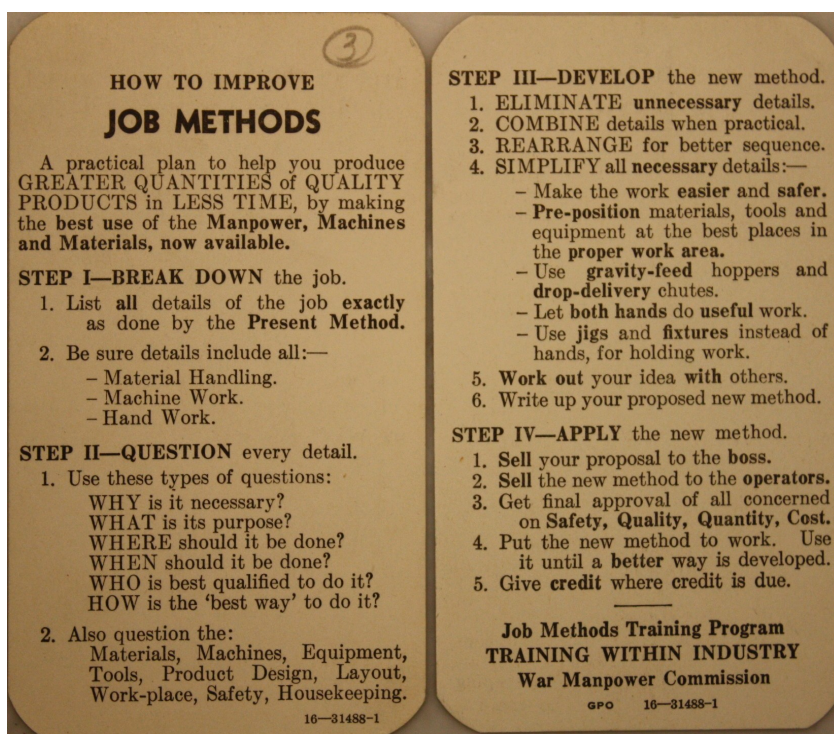
- **Presentation** - list and demonstrate individually important step, stressing key points, while the workers observe. Provide an opportunity for the workers to interact by asking questions.
- **Performance** - give the workers the opportunity to complete the steps of the process while they explain the key points. If workers cannot explain the key points, they have not internalized the instructions and explanations.
- **Follow-up** - monitoring the workers' performances as they complete the steps, and correct their actions before they become habits.

## 2.2 Job Methods

Job Methods was next very successful program for the TWI Service, based on Job Instruction experience. The first aim of the Job Methods program was to prevent supervisors from presenting and training ideas that were incomplete or flawed. By following the four-step Job Methods procedure, the supervisors would discover improvements during this process and create a feasible solution before presenting it to management (TWI, p. 230). Figure 4 shows JM card example developed by Training Within Industry Service USA in 1943.

TWI Job Method evolve in post-war-Japan in to KAIZEN, as known today.

Job Methods this days neatly wraps up continuous improvement program by building on the skills of the operators and first line leaders (team leaders, supervisors, group leaders...). The aim of the program is to produce greater quantities of quality products in less time by making the best use of the people, machines, and materials currently available. New methods are developed by eliminating, combining, rearranging, and simplifying steps in the process. Job Methods enhance most team based continuous improvement programs by delivering a high volume of small incremental improvements from individuals. Job Methods provides a system to get the most out of manpower, machines and materials currently available. It conditions and develops individuals to breakdown a job to its details and eliminates wasteful tasks, combines and rearranges necessary tasks and simplifies those tasks that are required.



**Fig. 4:** Job Methods Card. Source: SOURCE: War Production Board, Bureau of Training, Training Within Industry Service, 1943, *Job Methods: Sessions Outline and Reference Material* (Washington D.C.: U.S. Government Printing Office), Inside back cover.

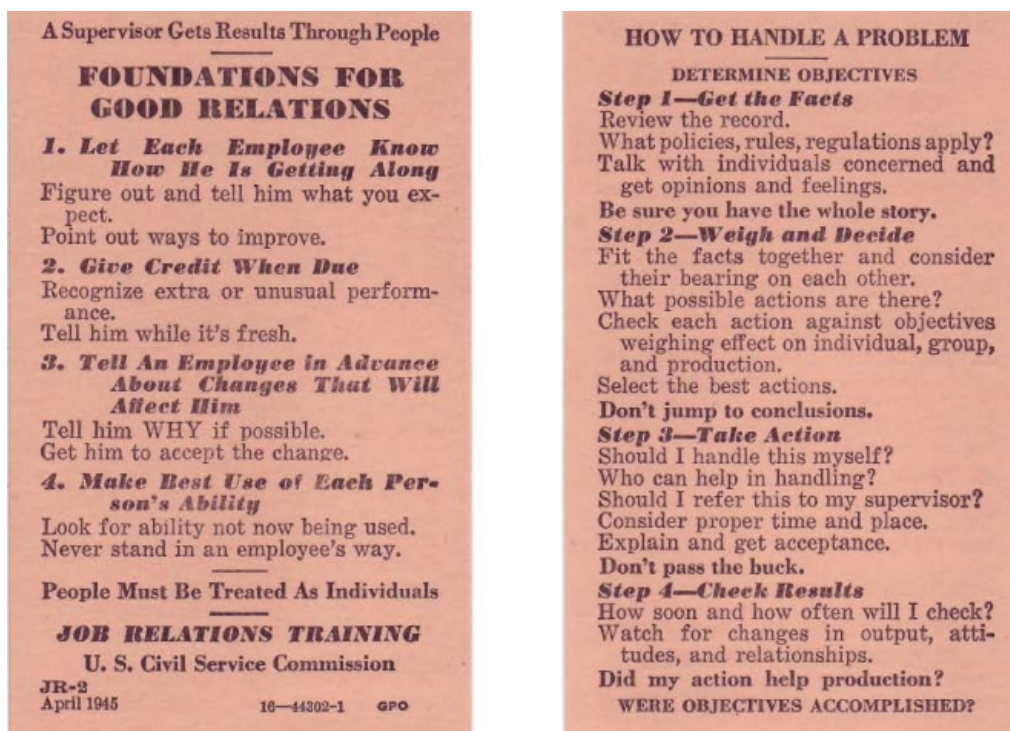
## 2.3 Job Relations

„Good relations lead to good results“, this can be the underlying objective of the Job Relations procedures. As usual the four-step method was used to develop the Job Relations procedures. The training consisted the principles using common case studies involving a fictitious supervisor and his employee. Each of the four steps shall be presented in a case study. Figure 5 shows JR card example developed by Training Within Industry Service USA in 1944.

Job Relations training teaches supervisors how to handle problems, how to prevent them from occurring, and, most importantly, it aids in developing a logical, common sense approach to handling issues with a people-centric view. When problems do arise, Job Relations teaches a proven method of getting the facts, weighing options, deciding, taking action, and checking results. Job Relations teaches the foundations of positive employee relations. Developing and maintaining these good relationships prevents problems from arising and is paramount to earn loyalty and cooperation from others. Benefits experienced from practicing Job Relations include increased productivity, improved attendance, better morale, and higher employee retention rates.

## 2.4 Program development

In next year's Job relation has grown in to Program Development. It had aimed to show how to setup and administer training within their own facility using their own people and to solve their company's own production problems through a training program using the "J" programs as a base. This days contents the „meta-course“ that taught those with responsibility for the training function to assist the line organization in solving production problems through training (*Dinero, 2005, p.139*).

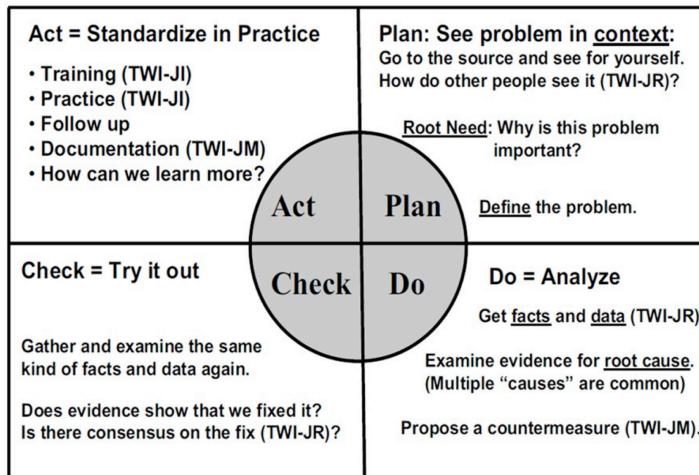


**Fig. 5:** Job Relation Card. Source: SOURCE: War Production Board, Bureau of Training, Training Within Industry Service, 1943, *Job Relations: Sessions Outline and Reference Material* (Washington D.C.: U.S. Government Printing Office), Inside back cover.

## 3 TWI and Continuous improvement

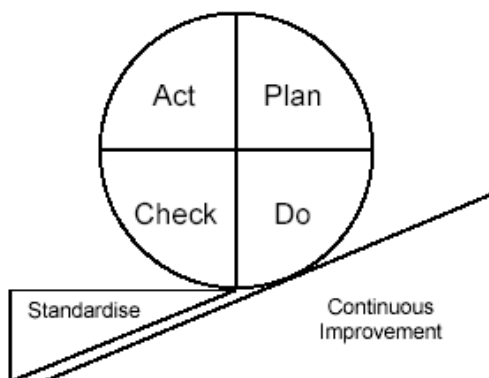
TWI desired and succeeded in giving supervisors a simple yet effective method for making improvements in their work area on a continual basis. TWI became essential part of PDCA (Plan, Do, Check, Act) in every day problem solving (see figure 6) (Huntzinger, 2002, p.6).

TWI program cultivates workers to solve as many problems as they can as often as they can. People kaizen a standard process, not one that has to be studied anew because standard work methods were not held. Standardization and improvement is nearly impossible unless workers learn to describe jobs well enough to instruct others to do them.



**Fig. 6:** Deming cycle and TWI. Source: *Huntzinger Jim. 2006. Why Standard Work is not Standard: Training Within Industry Provides an Answer* AME® Association for Manufacturing Excellence, p 11.

When a work organization can convert problem solutions to Standard Work and hold it, they can begin the next round of improvement from the existing Standard Work. When they can't, each kaizen (improvement) has to begin by observing what is really being done, whether a prior state collapsed, or whether something new has entered the process (see figure 7).



**Fig. 7:** Standard work as improvement guarantee

The engine that drives continuous improvement up is the collective effort of people. Improvement comes through employees that are engaged and aligned on the mission critical activities and have a set of skills which empowers their spirit to improve what they do on a daily basis.

#### *Why USA "lost" TWI?*

*At the end of World War II Production returned back to normal. And women returned back home. Back to normal meant that many men returned from the war to their old jobs, trying to take up where they had left off. Untrained in TWI methods, they saw no need for it, and their bottom-line managements saw no further need for it. The USA industrial base reigned supreme because it was the only one left standing (Huntzinger, 2002, p.19)*

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